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1 1. (Currently Amended) A data stream compression apparatus comprising
2
3 a data stream processing element for receiving a first stream of data entities at a
4 first line rate, each data entity including a data packet and a gap, the gap alone or
5 the gap and data packet both including non-unique, invariant content, and
6 responsive to a control signal for generating a second stream of data entities at a
7 second line rate which is less than the first line rate, each second stream data
8 entity including a data packet and a gap,
9
10 a control unit for providing said control signal identifying a predetermined portion
11 of non-unique, invariant content of said first stream of data entities, said
12 predetermined portion of non-unique, invariant content being identified using pre-
13 knowledge of the type of said first stream of data entities, and
14
15 wherein said data stream processing element in response to said control signal
16 removes said predetermined portion of non-unique, invariant content from a data
17 packet or gap of one or more data entities of said first stream thereby generating
18 said second data stream of data entities at the second line rate.

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1 2. (Original) The data stream compression apparatus of claim 1 wherein
2 the non-unique, invariant content of said first data stream is determined in real-
3 time.

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1 3. (Original) The data stream compression apparatus of claim 1 wherein
2 the non-unique, invariant content includes one or more interpacket characters.

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1 4. (Original) The data stream compression apparatus of claim 1 wherein
2 said first data stream is gigabit Ethernet data stream and the non-unique, invariant
3 content includes one or more PREAMBLE characters.

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1 5. (Original) The data stream compression apparatus of claim 1 wherein
2 said first data stream is gigabit Ethernet data stream and the non-unique, invariant
3 content includes one or more IDLE2 characters.

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1 6. (Original) The data stream compression apparatus of claim 1 wherein
2 said non-unique, invariant content of said first stream of data entities has been
3 predetermined.

1
1 7. (Original) The data stream compression apparatus of claim 1 being part
2 of a data communication system including said data stream compression
3 apparatus connected to transmit said second data stream over a communication

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4 link to a data stream expansion apparatus, said data stream expansion apparatus
5 comprising
6
7 a data stream processing element for receiving said second data stream of data
8 entities from the communication link at a second line rate and responsive to a
9 control signal for generating a first stream of data entities at a first line rate which
10 is greater than the second line rate,
11
12 a control unit for providing said control signal identifying a predetermined portion
13 of non-unique, invariant content which is to be added to said second data stream
14 of data entities, and
15
16 wherein said data stream processing element in response to said control signal
17 adds said predetermined portion of non-unique, invariant content to said second
18 data stream of data entities thereby generating said first data stream of data
19 entities at the first line rate.

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1 8. (Currently Amended) A data stream expansion apparatus comprising

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3 a data stream processing element for receiving a continuous second data stream of
4 data entities at a second line rate, each data entity including a data packet and a
5 gap, the gap having zero length or including non-unique, invariant content, and

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6 responsive to a control signal for generating a continuous first stream of data
7 entities at a first line rate which is greater than the second line rate,
8
9 a control unit for providing said control signal identifying a predetermined portion
10 of non-unique, invariant content which is to be added to said second data stream
11 of data entities, said control unit using pre-knowledge to identify said
12 predetermined portion of non-unique, invariant content which is to be added to
13 said second data stream of data entities, and
14
15 wherein said data stream processing element in response to said control signal
16 adds said predetermined portion of non-unique, invariant content to a data packet
17 or gap of one or more data entities of said second data stream thereby generating
18 said first data stream of data entities at the first line rate.

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1 9. (Original) The data stream compression apparatus of claim 8 wherein
2 the non-unique, invariant content of said first data stream is determined in real-
3 time.

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1 10. (Original) The data stream compression apparatus of claim 8 wherein
2 the non-unique, invariant content includes one or more interpacket characters.

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1 11. (Original) The data stream compression apparatus of claim 8 wherein
2 said first data stream is gigabit Ethernet data stream and the non-unique, invariant
3 content includes one or more PREAMBLE characters.

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1 12. (Original) The data stream compression apparatus of claim 8 wherein
2 said first data stream is gigabit Ethernet data stream and the non-unique, invariant
3 content includes one or more IDLE2 characters.

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1 13. (Original) The data stream compression apparatus of claim 8 wherein
2 said non-unique, invariant content of said first stream of data entities has been
3 predetermined.

1 14. (Currently Amended) A data compression multiplexer apparatus
2 comprising
3
4 (1) a plurality of data stream compression apparatuses, each comprising
5
6 a data stream processing element for receiving a first data stream of data entities
7 at a first line rate, each data entity including a data packet and a gap, the gap alone
8 or the gap and data packet both including non-unique, invariant content, and
9 responsive to a control signal for generating a second stream of data entities at a

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10 second line rate which is less than the first line rate, each second stream data
11 entity including a data packet and a gap,
12
13 a control unit for providing said control signal identifying a predetermined
14 portion of non-unique, invariant content of said first stream of data entities, said
15 predetermined portion of non-unique, invariant content being identified using pre-
16 knowledge of the type of said first stream of data entities, and
17
18 wherein said data stream processing element in response to said control
19 signal removes said predetermined portion of non-unique, invariant content from
20 a data packet or gap of one or more data entities of said first stream thereby
21 generating said second data stream of data entities at the second line rate, and
22
23 (2) a data stream multiplexer for multiplexing said plurality of second data
24 streams to generate a multiplexed data stream.

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1 15. (Previously Presented) A data compression multiplexer apparatus
2 comprising

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4 (1) a plurality of data stream compression apparatuses, each comprising

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6 a data stream processing element for receiving a first data stream of data
7 entities at a first line rate, each data entity including a data packet and a gap, and
8 responsive to a control signal for generating a second stream of data entities at a
9 second line rate which is less than the first line rate,

10

11 a control unit for providing said control signal identifying a predetermined
12 portion of non-unique, invariant content of said first stream of data entities, and

13

14 wherein said data stream processing element in response to said control
15 signal removes said predetermined portion of non-unique, invariant content of
16 said first stream of data entities thereby generating said second data stream of data
17 entities at the second line rate, and

18

19 (2) a data stream multiplexer for multiplexing said plurality of second data
20 streams to generate a multiplexed data stream, the data compression multiplexer
21 apparatus further comprising

22 eight data stream compression apparatuses,

23 wherein each said first data stream is a gigabit Ethernet data stream at 1.25
24 Gb/s, and

25 wherein said multiplexed data stream generated by said data stream
26 multiplexer is less than or equal to the SONET OC-192 line rate.

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1 16. (Original) The data compression multiplexer apparatus of claim 14
2 being part of a data communication system including said data compression
3 multiplexer apparatus connected to transmit said multiplexed data stream over a
4 communication link to a data expansion demultiplexer apparatus, the data
5 expansion demultiplexer apparatus comprising
6
7 (1) a data stream demultiplexer for demultiplexing a received multiplexed data
8 stream from the communication link into a plurality of second data streams and
9
10 (2) a plurality of data stream expander apparatuses, each for processing one of the
11 plurality of second data streams, each data stream expander apparatus including
12
13 a data stream processing element for receiving a second data stream of
14 data entities at a second line rate and responsive to a control signal for generating
15 a first stream of data entities at a first line rate which is greater than the second
16 line rate,
17
18 a control unit for providing said control signal identifying a predetermined
19 portion of non-unique, invariant content which is to be added to said second data
20 stream of data entities, and
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22 wherein said data stream processing element in response to said control
23 signal adds said predetermined portion of non-unique, invariant content to said
24 second data stream of data entities thereby generating said first data stream of
25 data entities at the first line rate.

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1 17. (Currently Amended) A data expansion demultiplexer apparatus
2 comprising

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4 (1) a data stream demultiplexer for demultiplexing a received multiplexed data
5 stream into a plurality of continuous second data streams and

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7 (2) a plurality of data stream expander apparatuses, each for processing one of the
8 plurality of continuous second data streams, each data stream expander apparatus
9 including

10

11 a data stream processing element for receiving a continuous second data
12 stream of data entities at a second line rate, each data entity including a data
13 packet and a gap, the gap having zero length or including non-unique, invariant
14 content, and responsive to a control signal for generating a continuous first stream
15 of data entities at a first line rate which is greater than the second line rate,

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17 a control unit for providing said control signal identifying a predetermined
18 portion of non-unique, invariant content which is to be added to said continuous
19 second data stream of data entities, said control unit using pre-knowledge to
20 identify said predetermined portion of non-unique, invariant content which is to
21 be added to said s continuous econd data stream of data entities, and
22
23 wherein said data stream processing element in response to said control
24 signal adds said predetermined portion of non-unique, invariant content to a data
25 packet or gap of one or more data entities of said continuous second data stream
26 thereby generating said continuous first data stream of data entities at the first line
27 rate.

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1 18. (Previously Presented) A data expansion demultiplexer apparatus
2 comprising

3

4 (1) a data stream demultiplexer for demultiplexing a received multiplexed data
5 stream into a plurality of second data streams and

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7 (2) a plurality of data stream expander apparatuses, each for processing one of the
8 plurality of second data streams, each data stream expander apparatus including

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10 a data stream processing element for receiving a second data stream of
11 data entities at a second line rate and responsive to a control signal for generating
12 a first stream of data entities at a first line rate which is greater than the second
13 line rate,

14

15 a control unit for providing said control signal identifying a predetermined
16 portion of non-unique, invariant content which is to be added to said second data
17 stream of data entities, and

18

19 wherein said data stream processing element in response to said control
20 signal adds said predetermined portion of non-unique, invariant content to said
21 second data stream of data entities thereby generating said first data stream of
22 data entities at the first line rate the data expansion demultiplexer apparatus
23 further comprising

24 eight data stream expansion apparatuses,

25 wherein the data rate of the received multiplexed data stream is less than
26 or equal to the SONET OC-192 line rate, and

27 wherein at least one of the data stream expansion apparatuses receives a
28 second data stream from the data stream demultiplexer and generates therefrom a
29 gigabit Ethernet data stream at 1.25 Gb/s.

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1 19. (Currently Amended) A method of operating a data stream
2 compression apparatus comprising the steps of:
3
4 receiving a first stream of data entities at a first line rate, each data entity
5 including a data packet and a gap, the gap alone or the gap and data packet both
6 including non-unique, invariant content,
7
8 identifying a predetermined portion of non-unique, invariant content of said first
9 stream of data entities using pre-knowledge of the type of said first stream of data
10 entities, and
11
12 removing said predetermined portion of non-unique, invariant content from a data
13 packet or gap of one or more data entities of said first stream thereby generating
14 said second data stream of data entities at the second line rate, each second stream
15 data entity including a data packet and a gap.

1 20. (Currently Amended) A method of operating a data stream expansion
2 apparatus comprising the steps of:
3
4 receiving a continuous second data stream of data entities at a second line rate,
5 each data entity including a data packet and a gap, the gap having zero length or
6 including non-unique, invariant content,

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8 identifying, using pre-knowledge information, a predetermined portion of non-
9 unique, invariant content which is to be added to said second data stream of data
10 entities, and

11

12 adding said predetermined portion of non-unique, invariant content to a data
13 packet or gap of one or more data entities of said second data stream thereby
14 generating ~~said~~ a first data stream of data entities at the a first line rate which is
15 greater than the second line rate.